CLAIMS

What is claimed is:

1. A method for forming a write head having an air bearing surface (ABS), comprising:

forming a flux shaping layer;

forming a pole tip layer on the shaping layer, the shaping layer being for focusing flux to the pole tip layer;

forming a mask layer above the pole tip layer, the mask layer being more resistant to milling than the pole tip layer;

forming a layer of resist above the mask layer;

patterning the resist, the patterned resist defining about a maximum width of the pole tip in a direction parallel to the ABS of the head;

removing portions of the mask layer not covered by the patterned resist;

milling for shaping a pole tip from the pole tip layer;

depositing a layer of dielectric material above the pole tip and flux shaping layer, wherein the layer of dielectric material extends about adjacent to the mask layer;

depositing a stop layer over the dielectric material, the stop layer abutting the mask layer;

polishing for forming a substantially planar upper surface consisting of the mask layer and stop layer;

forming a gap layer above the pole tip to a desired thickness; and

forming a trailing shield above the gap layer.

2. A method as recited in claim 1, wherein the pole tip layer is laminated.

3. A method as recited in claim 1, wherein the portions of the mask layer not covered by the patterned resist are removed by reactive ion etching.

4. A method as recited in claim 1, wherein the mask layer is formed of a material selected from a group consisting of carbon, a silicon nitrate, a tantalum oxide, a silicon oxide, and durimide.

5. A method as recited in claim 1, wherein the mask layer is formed of a material selected from a group consisting of Si_3N_4, Ta_2O_5, SiO_2, and durimide.

6. A method as recited in claim 1, wherein the mask layer is formed of carbon formed by filtered cathodic arc (FCA) deposition.

7. A method as recited in claim 1, wherein the mask layer is a multilayer structure.

8. A method as recited in claim 7, wherein the mask layer comprises at least one layer of carbon and at least one layer of durimide.

9. A method as recited in claim 1, wherein the pole tip layer is shaped to taper together towards the shaping layer along a plane perpendicular to the ABS.

10. A method as recited in claim 1, further comprising removing the mask layer prior to forming the gap layer, and forming dishing in the pole tip.

11. A method as recited in claim 10, wherein the mask layer is removed by additional polishing.

12. A method as recited in claim 10, wherein the mask layer is removed by etching.

13. A method as recited in claim 10, wherein the dishing is formed by etching.

14. A method as recited in claim 1, wherein the polishing is chemical mechanical polishing with a slurry selective to the dielectric material.

15. A method as recited in claim 1, further comprising forming a coil structure behind the trailing shield with respect to the ABS.

16. A method as recited in claim 1, further comprising forming a return pole above the trailing shield.

17. A method as recited in claim 1, wherein the head is a perpendicular head.

18. A method for forming a write head having an air bearing surface (ABS), comprising:

forming a flux shaping layer;

forming a pole tip layer on the shaping layer, a mask layer being formed above the pole tip layer;

shaping a tapered pole tip from the pole tip layer;

depositing a layer of dielectric material above the pole tip and flux shaping layer, wherein the layer of dielectric material extends about adjacent to the mask layer;

depositing a stop layer over the dielectric material, the stop layer abutting the mask layer;

polishing for forming a substantially planar upper surface consisting of the mask layer and stop layer; and

forming a gap layer above the pole tip to a desired thickness.

19. A method as recited in claim 18, wherein the pole tip layer is laminated.

20. A method as recited in claim 18, wherein the portions of the mask layer not covered by the patterned resist are removed by reactive ion etching.

21. A method as recited in claim 18, wherein the mask layer is formed of a material selected from a group consisting of carbon, a silicon nitrate, a tantalum oxide, a silicon oxide, and durimide.

22. A method as recited in claim 21, wherein the mask layer is a multilayer structure formed of at least two of the materials selected from the group consisting of carbon, a silicon nitrate, a tantalum oxide, a silicon oxide, and durimide.

23. A method as recited in claim 18, further comprising removing the mask layer prior to forming the gap layer, and forming dishing in the pole tip.

24. A method as recited in claim 23, wherein the mask layer is removed by overpolishing.

25. A method as recited in claim 23, wherein the mask layer is removed by etching.

26. A method as recited in claim 23, wherein the dishing is formed by etching.

27. A method as recited in claim 18, wherein the polishing is chemical mechanical polishing with a slurry selective to the dielectric material.

28. A method as recited in claim 18, further comprising forming a trailing shield above the gap layer and forming a coil structure behind the trailing shield with respect to the ABS.

29. A method as recited in claim 18, further comprising forming a trailing shield above the gap layer and forming a return pole above the trailing shield.

30. A method as recited in claim 18, wherein the head is a perpendicular head.

31. A method for forming a write head having an air bearing surface (ABS), comprising:

forming a flux shaping layer;

forming a pole tip layer on the shaping layer, a mask layer being formed above the pole tip layer;

shaping a tapered pole tip from the pole tip layer;

depositing a layer of dielectric material above the pole tip and flux shaping layer, wherein the layer of dielectric material extends about adjacent to the mask layer;

depositing a stop layer over the dielectric material, the stop layer abutting the mask layer;

polishing for forming a substantially planar upper surface consisting of the mask layer and stop layer;

removing the mask layer;

forming dishing in the pole tip;

forming a gap layer above the pole tip to a desired thickness; and

forming a trailing shield above the gap layer.

32. A magnetic storage system, comprising:

magnetic media;

at least one head having:

a reading portion for reading from the magnetic media; and

a writing portion for writing to the magnetic media, the writing portion having been formed according to the method of claim 1;

a slider for supporting the head; and

a control unit coupled to the head for controlling operation of the head.

33. A magnetic storage system, comprising:

magnetic media;

at least one head having:

a reading portion for reading from the magnetic media; and

a writing portion for writing to the magnetic media, the writing portion having been formed according to the method of claim 16;

a slider for supporting the head; and

a control unit coupled to the head for controlling operation of the head.

34. A magnetic storage system, comprising:

magnetic media;

at least one head having:

a reading portion for reading from the magnetic media; and

a writing portion for writing to the magnetic media, the writing portion having been formed according to the method of claim 31;

a slider for supporting the head; and

a control unit coupled to the head for controlling operation of the head.